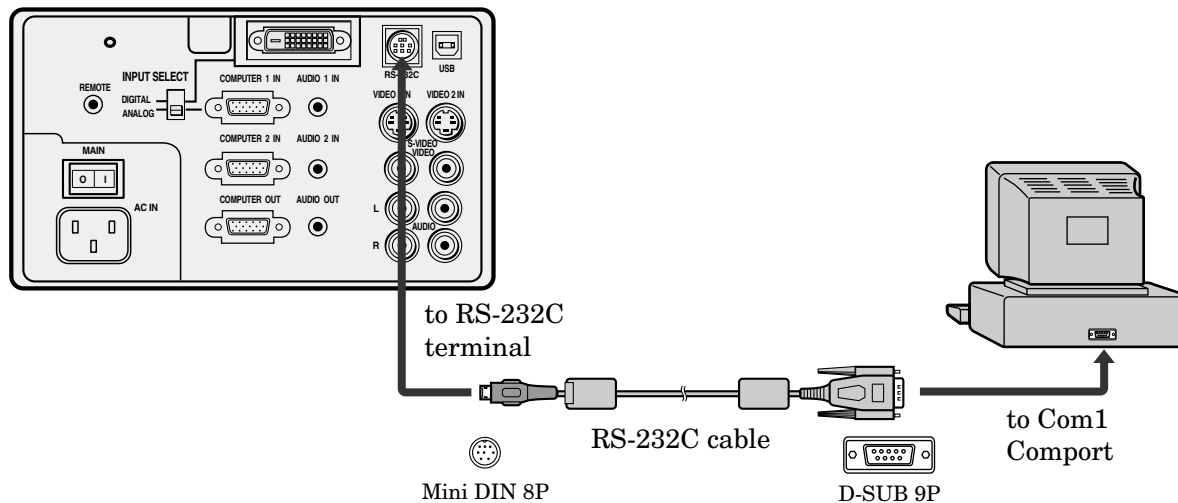# MITSUBISHI

LCD Projector

X500U / X490U / S490U

Control projector by using a personal computer

This projector can be controlled by connecting a personal computer with RS-232C terminal.

Functions can be controlled by a personal computer:

- Turn the ON or OFF
- Changing input signals
- Menu setting

Connection

Mini DIN 8P   RS-232C cable   D-SUB 9P

to RS-232C terminal

to Com1 Comport

Important:

- Make sure that your computer and projector are turned off before connection.
- Turn on the projector after the computer is started up.
  (If you do not follow this order, the Comport may not function.)
- Adapters may be necessary depending on the PC connected to this projector. Contact your dealer for details.

1) Interface

PROTOCOL	RS-232C
BAUD RATE	9600 [bps]
DATA LENGTH	8 [bits]
PARITY BIT	NONE
STOP BIT	1 [bit]
FLOW CONTROL	NONE

This projector uses RXD, TXD and GND lines for RS-232C control.

For RS-232C cable,the reverse type cable should be used.

2) Control command diagram

The command is structured by the address code, function code, data code and end code. The length of the command is different by each function.

	Address code	Function code	Data code	End code
HEX	30h 30h	Function	Data	0Dh
ASCII	'0' '0'	Function	Data	↵

[Address code]   30h 30h (In ASCII code, '0' '0') fixed.
[Function code]   A code of each fixed control move.
[Data code]   A code of each fixed control data (number) and not always indicated.
[End code]   0Dh (In ASCII code, '↵') fixed.

3) Control sequence

(1) Send the command from a personal computer to the projector. (The commands must be sent at least 400ms apart.)

(2) The projector will send a return command 400ms* after it has received an end code. If the command is not received correctly, the projector will not send the return command.

(3) The personal computer checks the command and confirms if the command which has been sent has been executed or not.

(4) This projector sends various codes other than the return code. When having a control sequence by RS-232C, reject other codes from personal computer side.

- * : The sending time of return command may delay depending on the condition (during changing the input signal, etc.).

[Example] Turn the power ON (' 'is for ASCII code)

Sending commands from the PC etc.	Status code from projector	Meaning
30 30 21 0D '0' '0' '!' '⏎'		Command for POWER ON
	30 30 21 0D '0' '0' '!' '⏎'	Command received (Command echo back)

4) Operation commands

The operation commands execute the basic operation setting of this projector. It may not operate when changing the signal.

Operation	ASCII	HEX		
POWER ON	!	21h		
POWER OFF	"	22h		
INPUT COMPUTER 1	_r1	5Fh	72h	31h
INPUT COMPUTER 2	_r2	5Fh	72h	32h
INPUT VIDEO 1	_v1	5Fh	76h	31h
INPUT VIDEO 2	_v2	5Fh	76h	32h

- POWER OFF command will not work for 1 minute after the power is turned on.
- POWER ON command will not work for 1 minute after the power is turned off.

[Example] Set the input signal to COMPUTER 1 (' 'is for ASCII code)

Sending commands from the PC etc.	Status code from projector	Meaning
30 30 5F 72 31 0D '0' '0' '_' 'r' '1' '⏎'		Command for setting the input signal to COMPUTER 1
	30 30 5F 72 31 0D '0' '0' '_' 'r' '1' '⏎'	Command received (Command echo back)

5) Computer input commands (For X500U only)

The computer input commands execute INPUT SELECT setting of COMPUTER 1.

ITEM	ASCII	HEX			VALUE
INPUT SELECT	DIF	44h	49h	46h	**0** : The same as INPUT SELECT switch setting of Terminal board. **1** : ANALOG setting (Mini D-SUB 15P). **2** : DIGITAL setting (DVI-24P).

How to set the grade

Use ASCII letters code to set the grade for setting data. Please refer to the table below for HEX code.

ASCII	'0'	'1'	'2'
HEX	30h	31h	32h

[Example] Set INPUT SELECT (of COMPUTER 1) to DIGITAL. (' 'is for ASCII code)

Sending commands from the PC etc.	Status code from projector	Meaning
30 30 44 49 46 32 0D '0' '0' 'D' 'I' 'F' '2' '⏎'		Command for setting the INPUT SELECT to DIGITAL.
	30 30 44 49 46 32 0D '0' '0' 'D' 'I' 'F' '2' '⏎'	Command received (Command echo back)

6) Volume commands

The volume commands execute the volume setting of this projector with the value.

ITEM	ASCII	HEX		VALUE
VOLUME	VL	56h	4Ch	**00 - 31**

How to set the grade

Use ASCII letters code to set the grade for setting data. Please refer to the table below for HEX code.

ASCII	'0'	'1'	'2'	'3'	'4'	'5'	'6'	'7'	'8'	'9'
HEX	30h	31h	32h	33h	34h	35h	36h	37h	38h	39h

[Example] Set the volume to 15 (Standard value) (' 'is for ASCII code)

Sending commands from the PC etc.	Status code from projector	Meaning
30 30 56 4C 31 35 0D '0' '0' 'V' 'L' '1' '5' '⏎'		Command for setting the volume
	30 30 56 4C 31 35 0D '0' '0' 'V' 'L' '1' '5' '⏎'	Command received (Command echo back)

7) Remote commands

Some remote control operations can be done by remote command codes.

Button's name on remote	ASCII	HEX		
+ VOLUME	r06	72h	30h	36h
− VOLUME	r07	72h	30h	37h
FOCUS/ZOOM	r0f	72h	30h	66h
KEYSTONE	r43	72h	34h	33h
EXPAND	r02	72h	30h	32h
PinP	r04	72h	30h	34h
MUTE	ra6	72h	61h	36h
▲	r53	72h	35h	33h
▼	r2b	72h	32h	62h
◄	r4f	72h	34h	66h
►	r59	72h	35h	39h
MENU	r54	72h	35h	34h
ENTER	r10	72h	31h	30h
AUTO POSITION	r09	72h	30h	39h
STILL	ra4	72h	61h	34h

[Example] Display MENU selection bar. (' 'is for ASCII code)

Sending commands from the PC etc.	Status code from projector	Meaning
30 30 72 35 34 0D '0' '0' 'r' '5' '4' '⏎'		Command as same as MENU button
	30 30 72 35 34 0D '0' '0' 'r' '5' '4' '⏎'	Command received (Command echo back)

8) Reading command diagram

Monitor projector operation status. The power ON, OFF and input terminal settings can be monitored.

	ASCII		HEX	
	Function	Data (Receive)	Function	Data (Receive)
POWER ON	vP	1	76h 50h	31h
POWER OFF	vP	0	76h 50h	30h
INPUT COMPUTER 1	vI	r1	76h 49h	72h 31h
INPUT COMPUTER 2	vI	r2	76h 49h	72h 32h
INPUT VIDEO 1	vI	v1	76h 49h	76h 31h
INPUT VIDEO 2	vI	v2	76h 49h	76h 32h

When a personal computer sends the command, data code will not be attached. On the other hand, the projector which has received a command will attach the recent operating status and then send.

[Example] Input was Video 1 when the operating status of the input terminal was confirmed.

Sending commands from the PC etc.	Status code from projector	Meaning
30 30 76 49 0D '0' '0' 'v' 'I' '⏎'		Command to confirm input
	30 30 76 49 76 31 0D '0' '0' 'v' 'I' 'v' '1' '⏎'	Command (Input is Video 1) carried out

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9) Menu setting commands

The menu setting commands execute the menu setting of this projector. If the personal computer doesn't send the commands without attaching the data code, the projector which has received the command replays the setting data as data code.

ITEM	ASCII	HEX				VALUE
CONTRAST	P	50h				±**30**±**30**±**30** (R from G+Main data+B from G)
BRIGHTNESS	Q	51h				±**30**±**30**±**30** (R from G+Main data+B from G)
sRGB	SRGB	53h	52h	47h	42h	**0** (OFF), **1** (ON)
COLOR MATRIX (MODE)	CMT	43h	4Dh	54h		**1** (VIDEO), **2** (COMPUTER), **3** (USER), **4** (OFF)
COLOR MATRIX (R, G, B)	MRGB	4Dh	52h	47h	42h	±**30**±**30**±**30** (R+G+B)
COLOR MATRIX (Y, C, M)	MYCM	4Dh	59h	43h	4Dh	±**30**±**30**±**30** (Y+C+M)
COLOR MATRIX (SATURATION)	MSAT	4Dh	53h	41h	54h	±**05**
COLOR TEMP.	A	41h				**1** (Standard), **2** (High), **3** (Low), **4** (User)
COLOR	T	54h				±**10**
TINT	S	53h				±**10**
SHARPNESS	R	52h				±**10**
IRIS	AI	41h	49h			**0** (OFF), **1** (1), **2** (2), **3** (3)
AUTO POWER ON	APON	41h	50h	4Fh	4Eh	**0** (OFF), **1** (ON)
AUTO POWER OFF	APOF	41h	50h	4Fh	46h	**00** (Off) , **05**, **10**, **15**, **30**, **60**
SPLASH SCREEN	SS	53h	53h			**0** (OFF), **1** (ON)
BACK COLOR	BB	42h	42h			**0** (BLACK), **1** (BLUE)
LAMP MODE	LM	4Ch	4Dh			**0** (STANDARD), **1** (LOW)
IMAGE REVERSE	IR	49h	52h			**0** (OFF), **1** (Mirror), **2** (Invert), **3** (Mirror invert)
MENU POSITION	MP	4Dh	50h			**0** (Upper left), **1** (Lower right)
EXPAND MODE	EX	45h	58h			**1 - 4**
FRAME POSITION	FM	46h	4Dh			**1 - 5**
VIDEO SIGNAL	VS	56h	53h			**0** (AUTO), **1** (NTSC), **2** (PAL), **3** (SECAM) , **4** (4.43NTSC), **5** (PAL-M), **6** (PAL-N), **7** (PAL-60)
ANAMORPHIC	SC	53h	43h			**0** (OFF), **1** (ON)
LANGUAGE	LG	4Ch	47h			**0** (　　　), **1** (English), **2** (Español), **3** (Deutsch) , **4** (Français), **5** (Italiano), **6** (　　)
RESET ALL	RSTALL	52h 53h 54h 41h 4Ch 4Ch				
MEMORY CALL	MMC	4Dh	4Dh	43h		**0** (AUTO), **1** (USER1), **2** (USER2)
HORIZ. POSITION	HP	48h	50h			**+** (increase), **–** (decrease)
VERT. POSITION	VP	56h	50h			**+** (increase), **–** (decrease)
FINE SYNC.	FN	46h	4Eh			**00 - 39**
TRACKING	TRK	54h	52h	4Bh		**+** (increase), **–** (decrease)
COMPUTER INPUT	CIN	43h	49h	4Eh		**0** (RGB), **1** (YCBCR/YPBPR)
HOLD	HLD	48h	4Ch	44h		**0** (AUTO), **1** (ON), **2** (OFF)
HOLD BEGIN	HLB	48h	4Ch	42h		**–01 - –99**
HOLD END	HLE	48h	4Ch	45h		**01 - 99**
CLAMP POSITION	CLP	43h	4Ch	50h		**00 - 63**
CLAMP WIDTH	CLW	43h	4Ch	57h		**01 - 63**
HORIZ. PIXELS	HPL	48h	50h	4Ch		**0000 - 9999**
VERT LINES	VLN	56h	4Ch	4Eh		**0000 - 9999**
VERT.SYNC	VSC	56h	53h	43h		**0** (AUTO), **1** (ON), **2** (OFF)
SHUTTER (U)	SHU	53h	48h	55h		**000 - 383 (000-299 : For S490U)**
SHUTTER (L)	SHL	53h	48h	4Ch		**000 - 383 (000-299 : For S490U)**
SHUTTER (LS)	SHLS	53h	48h	4Ch	53h	**000 - 510 (000-398 : For S490U)**
SHUTTER (RS)	SHRS	53h	48h	52h	53h	**000 - 510 (000-398 : For S490U)**
MUTE	MUTE	4Dh	55h	54h	45h	**0** (MUTE OFF), **1** (MUTE ON)

How to set the grade

Use ASCII letters code to set the grade for setting data. Please refer to the table below for HEX code.

ASCII	'+'	'Å|'	'0'	'1'	'2'	'3'	'4'	'5'	'6'	'7'	'8'	'9'
HEX	2Bh	2Dh	30h	31h	32h	33h	34h	35h	36h	37h	38h	39h

[Example 1]   Set the AUTO POWER ON to ON.

Sending commands from the PC etc.	Status code from projector	Meaning
30 30 41 50 4F 4E 31 0D '0' '0' 'A' 'P' 'O' 'N' '1' '⏎'		Command for setting the AUTO POWER ON to ON
	30 30 41 50 4F 4E 31 0D '0' '0' 'A' 'P' 'O' 'N' '1' '⏎'	Command received (Command echo back)

The data code of CONTRAST and BRIGHTNESS is structured by the difference data of R from G, the main data and the difference data of B from G.

[Example 2]   Set the difference data of R from G to +10, the setting main data to 0 and the difference data of B from to -5.

Sending commands from the PC etc.	Status code from projector	Meaning
30 30 50 2B 31 30 2B 30 30 2D 30 35 0D '0' '0' 'P' '+' '1' '0' '+' '0' '0' '-' '0' '5' '⏎'		Command for setting the picture control
	30 30 50 2B 31 30 2B 30 30 2D 30 35 0D '0' '0' 'P' '+' '1' '0' '+' '0' '0' '-' '0' '5' '⏎'	Command received (Command echo back)

[Example 3]   The TINT was set to +10 when the setting status was confirmed.

Sending commands from the PC etc.	Status code from projector	Meaning
30 30 53 0D '0' '0' 'S' '⏎'		Command to confirm setting of TINT
	30 30 53 2B 31 30 0D '0' '0' 'S' '+' '1' '0' '⏎'	Command (setting of TINT is +10) carried out